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Some Recent Improvements in the Transportation  
and Storage of Planting Stock in the Field



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United States Department of Agriculture

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U. S. Forest Service

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SOME RECENT IMPROVEMENTS IN THE TRANSPORTATION  
AND STORAGE OF PLANTING STOCK IN THE FIELD

by J. E. Hetzel, Junior Forester

Three recent mechanical improvements, directed toward the better protection and care of planting stock after it leaves the nursery, are described in this paper.

A collapsible crate for shipping planting stock

The design of this crate (Fig. 1) is intended (1) to provide maximum safety to planting stock during shipment; (2) to facilitate the return of empty crates to the nursery for re-use; (3) to reduce (by approximately 75 percent) the amount of storage space required when the crates are not in use (Fig. 2); and (4) to reduce maintenance costs through the use of interchangeable side and end units and individual parts.

The crate illustrated in Fig. 1 is 2' x 2' x 4'. However, after putting a crate of these dimensions to actual test during a 200-mile shipment of stock in 1939, it was decided that the size should be reduced by one-third or one-half, for easier handling. At the present time Parsons Nursery is using two sizes of crate: 18" x 20" x 30" (for coniferous stock, weighing 130 pounds when filled with 1,500 3-1 red pine) and 18" x 22" x 36" (for hardwood stock). Measurements given below are for a crate 20" x 20" x 30" having a capacity about midway between the two Parsons crates.

The four sides are identical in pattern, size and construction to simplify replacement in the event of breakage and to reduce cost of construction. The two ends are identical also. The construction of these units lends itself to quantity production methods; by using a form or jig, rapid assembly is possible, while uniform construction assures interchangeability and easy replacement of members of the same dimensions. By the use of one-half-inch material, weight has been lessened without undue reduction of strength.

In use, the side and end units are neither nailed nor otherwise fastened to each other (Fig. 3), but are placed in a cradle while being filled. When fully packed, the top is put on and the whole is bound

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\* In cooperation with the University of Pennsylvania.

with wire or with metal binding ribbon, after which the crate may be removed from the cradle.

Parts required for 20" x 20" x 30" crate:

Ends: 16 pcs. 1/2" x 4" x 16" box lumber  
2 pcs. 16" x 16" hardware cloth (1/2" mesh)

Sides: 16 pcs. 1/2" x 4" x 30" box lumber  
16 pcs. 19" x 1" x 1" clear lumber  
4 pcs. 19" x 1" x 2" (or wider) box lumber

In hauling planting stock long distances (e. g., from Parsons Nursery in West Virginia to Allegheny National Forest in Pennsylvania - about 250 miles) considerable difficulty has been experienced in preventing the heating and molding of stock at the center of the crate. This difficulty has been very largely, if not entirely, circumvented by packing the uncrated stock directly into the bed of the truck between layers of sphagnum moss to form successive courses, each course being alternated in turn with a layer of crushed ice. This method, however, is practicable only in the shipment of large orders over long distances.

#### Central Heeling-in Beds for Planting Stock

Considerable loss of stock has resulted in the past through inadequate protection of planting stock in the heeling-in beds. Until recently, the practice has been to prepare a small bed at some convenient place on the planting project - usually along a stream and when possible, under natural shade. Where the latter was lacking, an artificial cover of boughs or canvas was usually erected. In many instances, however, the soil was too heavy, or the degree of shade or supply of water inadequate. Beds located at outlying points necessitated undue travel and occasionally resulted in losses by theft.

The need for central heeling-in beds in the proper care of stock on Allegheny National Forest was suggested by the Station and general plans were provided the forest. The beds, constructed at two CCC camps, are similar to those in use by the T. V. A., and combine the advantages of adequate water supply and shade, proper soil texture, and maximum efficiency in protection and distribution of the stock.

The size of the Camp F-1 bed (Fig. 4) is 40' x 60', with head-room of 7' 6" at the eaves; the pitch of the roof is slightly less than one-quarter. The posts are of chestnut, set 3' in the ground, which was later covered with an 18" layer of carefully selected sandy soil. Rafters, plates, braces, and scantling are of sawn lumber. Canvas is spread over the wooden framework during the planting season to provide full shade. A loading platform at truck-bed height adjoins the road at the center of the south side.

### The Allegheny Planting Stock Basket

The Allegheny planting stock basket (see Fig. 5) is used to transport stock from the central heeling-in bed to the crew in the field, where the stock is transferred, as needed, to the Ehrhart trays carried by the individual planters. The use of temporary heeling-in beds in the field is thus entirely eliminated.

In use, the basket is first lined with wet sphagnum moss. The stock, still in bunches (usually of 50) as tied at the nursery, is then placed upright in the basket, with tops exposed. In the field the basket of stock is placed in a cool shady place, to be drawn upon by the crew. The basket may, at the discretion of the planting foreman, be set in a shallow trench, with the earth banked up around the sides and ends; or in the absence of natural shade it may be covered with moist burlap, separated from the stock by a few small branches (to prevent wetting of the tops, which is apt to result in subsequent scalding). No more stock should be taken to the field than is actually needed for the day, and no more than two bunches of stock should be carried in a planter's tray at one time, as the supply basket may be moved up behind the crew from time to time in order to prevent delays. Stock which remains unplanted at the end of the day is taken back to the central heeling-in bed at the close of the day's work.

Before constructing the stock baskets, a substantial wooden form should be made, on which to fold the hardware cloth (see Fig. 6). The base of this form is 14" x 36" (the dimensions of the top of the basket); the top of the form is 11" x 33". The shortest dimension of the side surface is 12-1/2".

A piece of 19-gauge, 1/2" mesh hardware cloth 58" long is cut from a roll of material 36" wide. This piece is centered over the top of the wooden form and the cloth folded down, first over the ends of the form, then over the sides. Care should be taken to be sure that the cloth actually meets at the corner of the form (i.e., along the intersection of end and side surfaces) while the ends of the basket are being folded into shape. The cloth is then removed and the end flaps secured by a single rivet (with washers) at each end of the basket. Excess cloth extending above the rim of the basket is trimmed off.

The frame is constructed of 1/8" x 1" strap iron and is fastened with rivets and washers. The three longitudinal supporting runners should follow the center and edges of the bottom surface of the basket. One or two (preferably two) transverse supports should pass under the basket (but above the runners) to prevent bellying of the basket when loaded.

The edges of the basket are fastened to the rim with rivets and washers at 4" intervals. The runners should be riveted to the bottom of the basket to prevent their displacement. Handles of 1/2" round iron are provided at each end of the basket as shown in the illustration.

Materials required:

- 1 pc. hardware cloth 36" x 58" (19 ga. 1/2" mesh)
- 39 ft. strap iron 1/8" x 1"
- 4 ft. round iron 1/2"
- Rivets, washers.

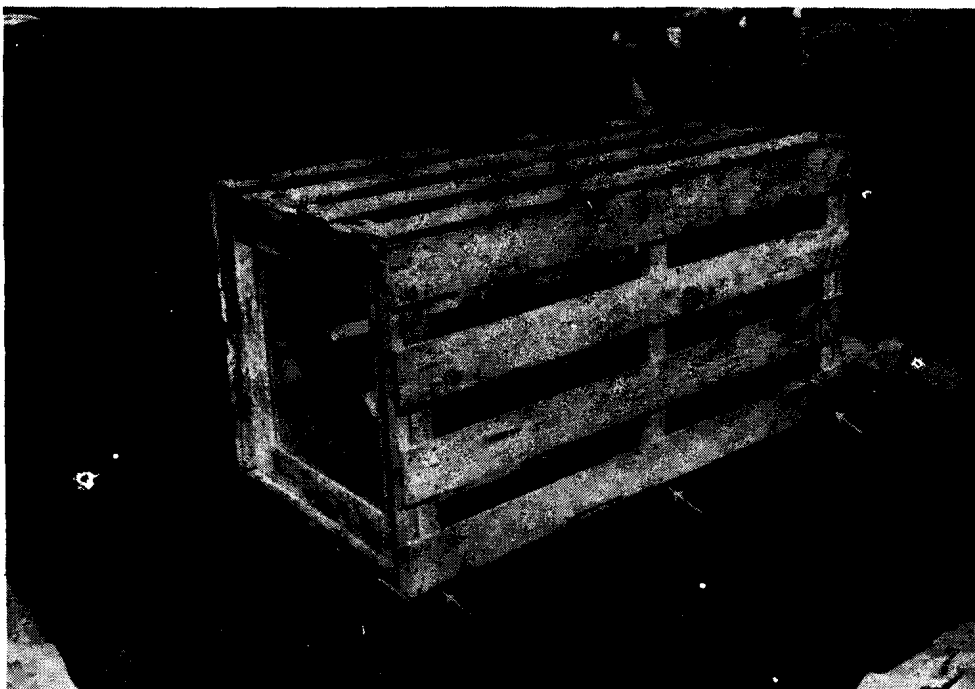


Fig. 1 Collapsible crate used for transporting planting stock from the nursery to the field. Fully assembled, but without wire bindings, which are fastened around crate at points indicated by the three arrows. (Oversize crate, 24" x 24" x 48").

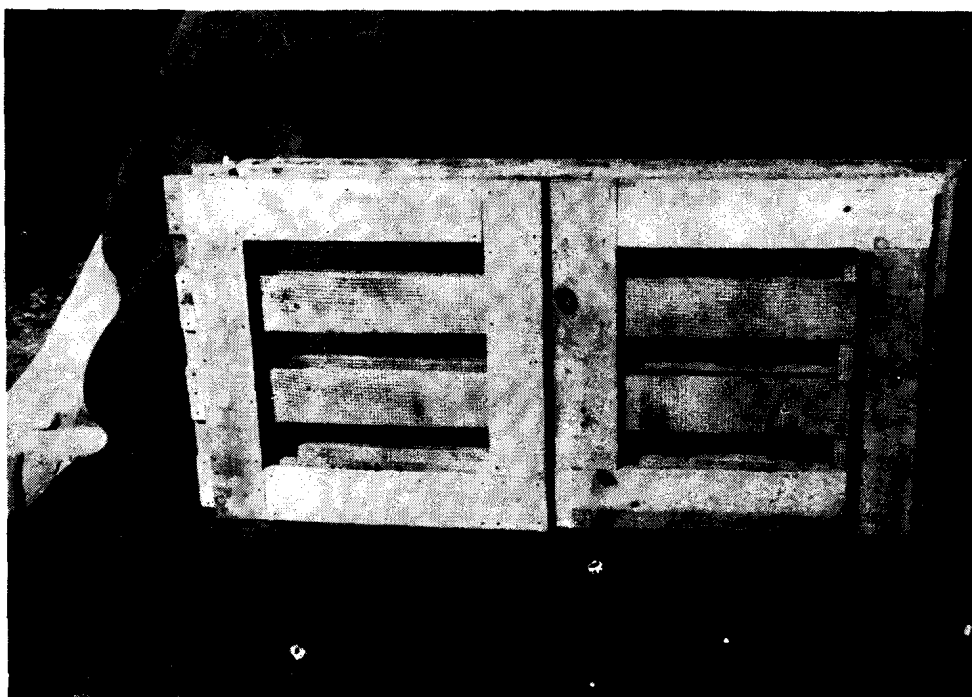


Fig. 2 Crate unassembled, for return to nursery.

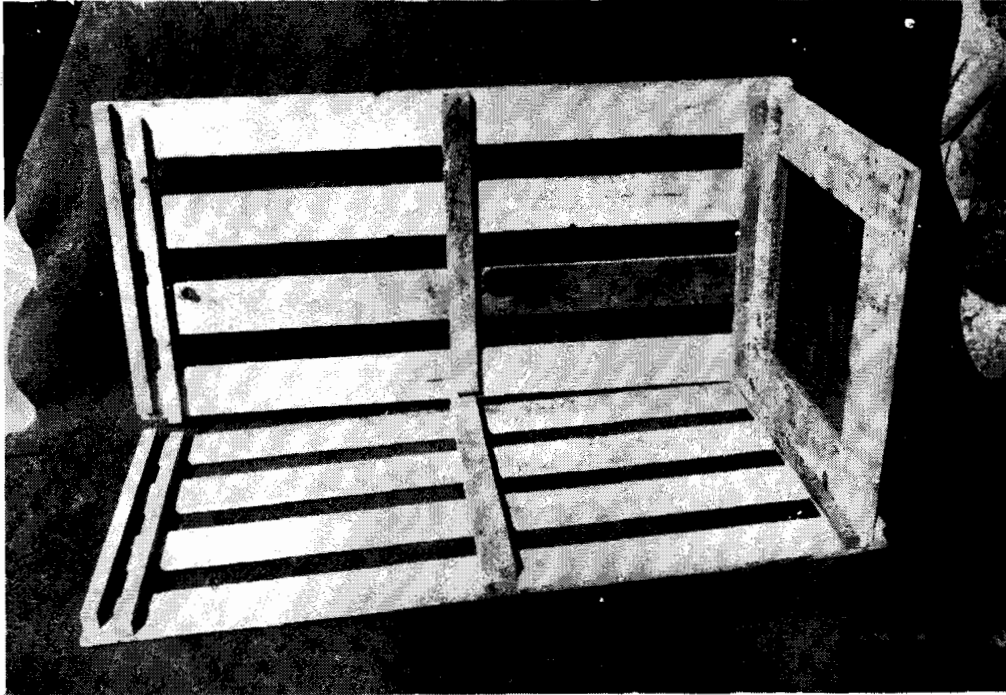


Fig. 3 Crate partially assembled, showing method of fitting sides and ends.

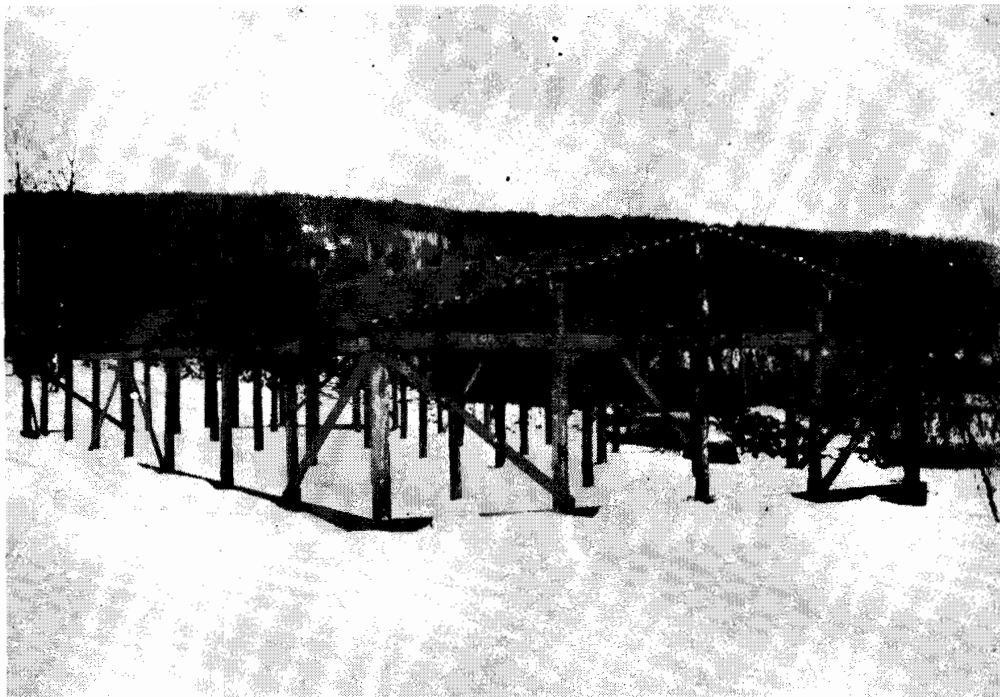


Fig. 4 General view of central heeling-in bed at CCC Camp F-1 on Allegheny National Forest, showing construction of support for canvas cover.

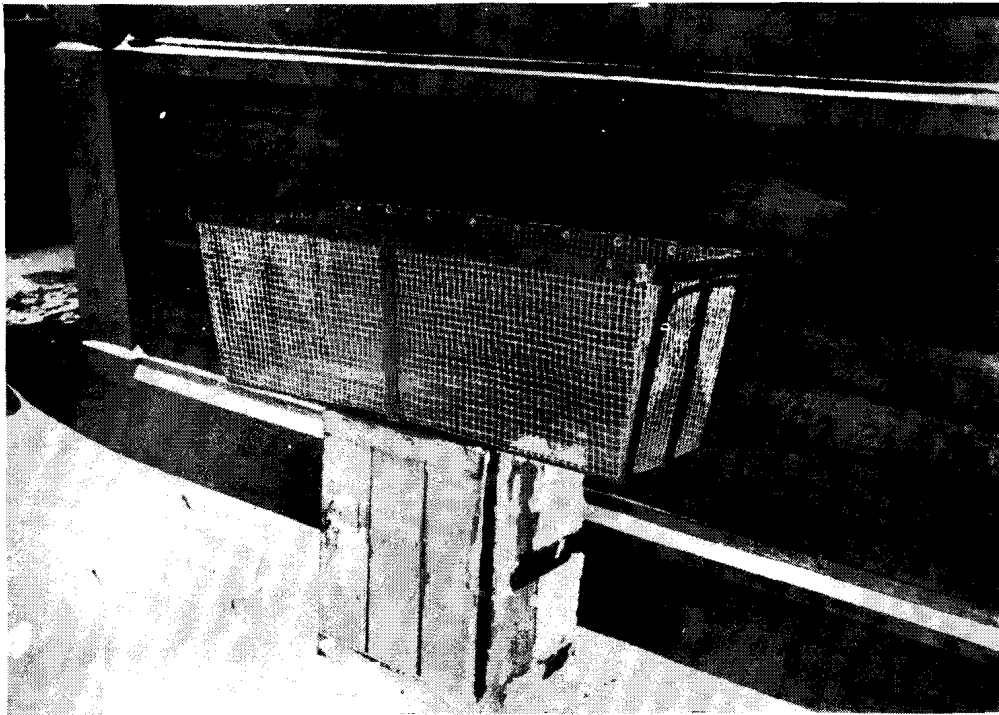


Fig. 5 The Allegheny Planting Stock Basket.

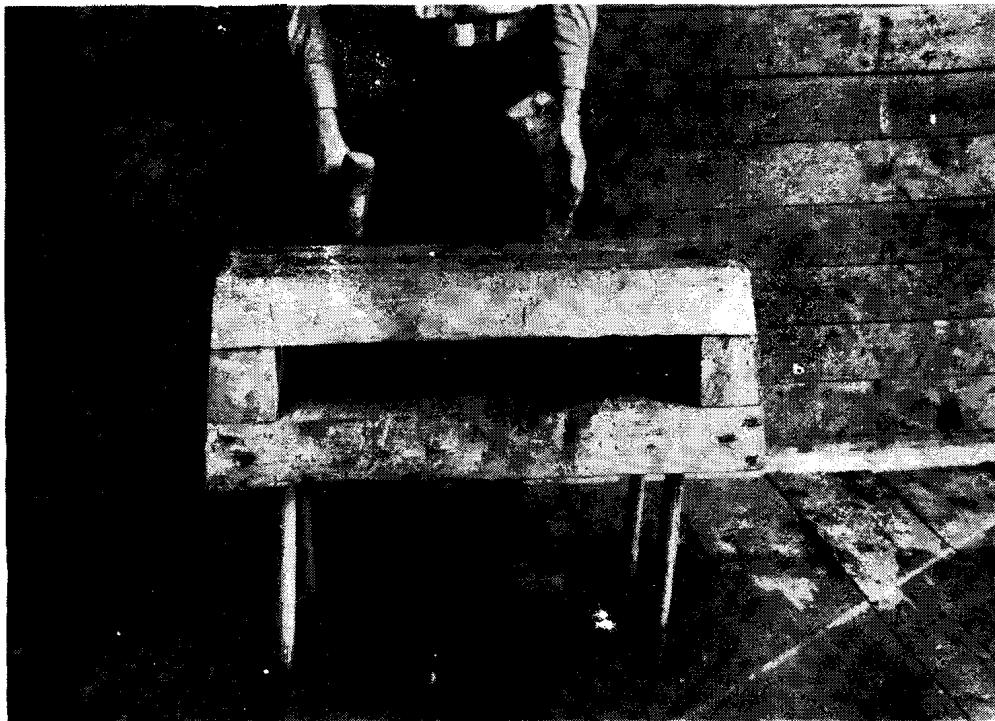


Fig. 6 Wooden form over which hardware cloth is folded to shape of basket.



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